

## RIVERS AND FLOODS, OCTOBER, 1911.

By H. C. FRANKENFIELD, Professor in Charge River and Flood Division.

As a rule the month of October is one of comparative immunity from floods, but during the present month there were two that, occurring at any time of the year, could be considered as great floods. Both took place during the early days of the month, one in the rivers of Wisconsin, and the other in western Colorado and northwestern New Mexico. The floods in Wisconsin were the highest for 30 years, with the single exception of the year 1900, while the Rocky Mountain floods were beyond all records and traditions.

The losses from the Wisconsin floods amounted to between \$2,500,000 and \$3,000,000, about 80 per cent of which occurred in the Black River Valley. In the city of Black River Falls, Wis., alone, the damage amounted to \$1,500,000, according to the estimate of the city council.

The losses from the Rocky Mountain floods amounted to about \$1,000,000, of which not less than one-half fell upon the railroads. Detailed accounts of the floods will be found in the district reports in this Review.

Warnings for the Wisconsin floods were issued as soon as the water began to rise, and were repeated frequently until all danger was over. They were of great benefit to all concerned and were the subject of much commendation from the press and business interests generally. It is estimated that property to the value of \$300,000 was saved by the warnings along the Wisconsin River.

No flood warning service is maintained in southwestern Colorado and northwestern New Mexico.

The flood waters from the Wisconsin rivers also caused a marked rise in the upper Mississippi River, although flood stages were not reached. The river was higher than at any time since July, 1908, and the damage to crops in lowlands amounted to perhaps \$100,000, a like amount being saved, however, by the timely warnings furnished.

The southwestern Colorado and northwestern New Mexico flood waters were carried into the Colorado River and the Rio Grande, causing in both marked rises that were correctly and promptly forecast. Flood stages were exceeded in the Rio Grande from below Espanola, N. Mex., to some distance south of El Paso, Tex., and in the Colorado River at Topock, Ariz.

There was a second flood in the Wisconsin River, beginning on October 17. It was not of great importance, but owing to the weakened condition of the levees, dams, etc., warnings were issued. These were of a reassuring character and stated that the stage of water would not be as high as that of the preceding week.

Considerable inconvenience resulted, but without actual damage.

Heavy rains on September 25, 27, 28, and October 1, resulted in floods in the north and south Fabius Rivers, and in the North and South Rivers in the vicinity of Hannibal, Mo., causing crop damage to the amount of about \$10,000. The general conditions that caused these floods extended eastward over the Ohio Valley, causing flood stages in the Illinois and some of the smaller rivers, but without damage of consequence, except along the Mahoning and Beaver Rivers. The Allegheny River was also quite high. Along the Beaver and Mahoning Rivers and their tributaries many bridges were washed away and several dams were broken. The damage was about as follows:

Property, excluding crops.....	\$500,000
Crops.....	5,000
Damage to farms land.....	50,000
Total.....	555,000

Value of property saved through Weather Bureau warnings, about \$50,000. Warnings were issued as soon as the reports of heavy rainfall were received, and they proved to be of much value to contractors engaged in hydraulic work.

There were minor floods of short duration in some of the rivers of South Carolina and eastern Georgia during the third decade of the month. Warnings were issued at the proper time and no damage was reported.

The heavy rains of October 18 over New England caused a rapid rise in the lower Connecticut River, and the flood stage of 16 feet was reached at Hartford, Conn., at 10 a. m., October 20. A large quantity of drift was brought down and a number of boats were torn from their moorings. The actual damage, however, was small.

Nothing of consequence occurred in the Missouri, the lower Mississippi, and the Ohio Rivers, except that the stages averaged somewhat higher than is usual for the time of the year. The rivers of the Pacific States were at the usual stages for the season.

Hydrographs for typical points on several principal rivers are shown on Chart I. The stations selected for charting are Keokuk, St. Louis, Memphis, Vicksburg, and New Orleans, on the Mississippi; Cincinnati and Cairo, on the Ohio; Nashville, on the Cumberland; Johnsonville, on the Tennessee; Kansas City, on the Missouri; Little Rock, on the Arkansas; and Shreveport, on the Red.